The identity and work of the ancient Egyptian surgeon

Richard Sullivan BSc MBBS

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SUMMARY

That a well-developed and hierarchical medical profession existed in Pharaonic Egypt is without doubt. What is a matter of contention is the existence of a recognizable surgical profession, or even of the practice of surgery by medically qualified personnel. Palaeoarchaeological specimens that demonstrate some form of surgical procedure are rare. Medical papyri and the treatises of the historians of antiquity provide a far more reliable source of information on surgical practice. They have indicated possible titles for surgeons, and the types of instruments used.

WHO WAS THE ANCIENT EGYPTIAN SURGEON?

History has not been kind to the medical historian. Little indigenous evidence of the ancient Egyptian medical system has survived to modern times. What is available is often fragmentary and contradictory in both content and interpretation. The decipherment of hieroglyphic and hieratic texts, especially of a scientific nature, although advanced, is not without its syntactic problems.

From these texts it has been determined that the Egyptian word for a lay physician was **swnw**, from the hieroglyphic for the arrow, not the lancet as has often been suggested or the medicine pot with the seated man determinative. Variations of this included the replacement of the lancet with a loaf (Gardiner's list X4 & 5)[1], and the papyrus roll, or striking man, for the seated man determinative[2]. Although Grapow initially used this translation in his monumental work, *Grundiß der Medizin der Alten Ägypter*[3], he later preferred the reading **sinw**(III, 86, n.a.), basing this on the Coptic **MET**(Wb.III. 427) for doctor, which, with the prefix **CAEIN**, becomes, **MNTCAEIN**, or **METCHINI**[4], the art of medicine. That **swnw**, or **sinw**, is medically qualified is in no doubt, as Jonckherre[5] demonstrated by the collection of 16 instances of the use of this word in medical papyri.

However, the etymology of these hieroglyphics is difficult. It would be logical to interpret them simply as 'man of the arrow and medicine pot'. This would imply that it was a term that embraced all medically qualified personnel regardless of specialization. But this translation is problematic as it does not differentiate in meaning between a medically qualified individual and a specialist, i.e. a surgeon. To describe the arrow as a lancet, and therefore an 'opener of the body', and thus related to surgery, is probably incorrect, and certainly risky in the context of a language that normally uses puns to express itself[3]. **swnw** is more likely to be related to the two words **swn**, meaning 'affliction' and **swny.t**, 'pain'[6] and so mean a 'man of the pain, or healing'. The fact that it is a term used to denote medical qualification in the widest sense, including veterinary practice, rather than an indication of the union of surgery with medicine, is further indicated by the writings of Herodotus[7] and Plutarch (Figure 1). If we have established that **swnw** were the doctors of ancient Egypt, the next question is whether the available texts support the hypothesis that surgery existed as a separate profession.

The first searches instigated by Jonckherre[5] into possible titles belonging to surgeons found four instances of the title **wr-ḥ'.w** (great one of the body) in a number of locations: (i) Dendreh, High priest of Sais relief[8]; (ii) **Gm.n.f.-Ḥr** of the Saite period in the Alexandria Museum (Daressy 1904)[9]. (iii) Sag-el-Hagar (ibid); (iv) Saite relief in the Turin Museum (N2201). Petrie[10] translated it as 'Great One in Flesh Doctoring', but the title has never been found in conjunction with **swnw** and so the speculation that it may have referred to surgeons as a separate entity may be totally unfounded. However, the finding of this title in connection with the high priesthood of Sais is important because the priests were also known as **wr swnw**, thus establishing their connection with the medical profession.

In the Ebers papyrus the section dealing with tumours has mention of **sꜣ-ḫmm** [Wb. III. 95.11–12 (Wb. reference refers to grammatical notations in the *Wörterbuch.*)], ostensibly a 'son of **ḫmm**'. This word has been identified as a tool, probably a cautery[6], and there has been speculation as to whether this 'son' was perhaps the elusive Egyptian surgeon. The most likely deduction is that the expression was a reference to a profession from which the physician

Department of Physiology, University College London, Rockefeller Building, London, England

Correspondence to: Dr R Sullivan, Department of Physiology and Molecular Cell Biology, University College London, Rockefeller Building, London WC1E 6JJ, England

Figure 1 **Pliny the Elder with Vesuvius erupting, where he met his death: another of the great historians of antiquity who wrote on ancient Egypt. (*Courtesy of the Trustees of the Wellcome Trust*)**

borrowed the cautery, or **ḥmm**, in order to treat the tumours. It is not universally accepted that **ḥmm** was a cautery. In the Ebers papyrus 865 there is a reference to 'pushing, kicking or piercing' an '**ȝt** swelling with a **ḥmm**. The patient seems to have 'water of the abdomen going up and down', which suggests ascites. One wonders if the **sȝ-ḥmm** refers to a man who carries out some particular surgical procedure.

Perhaps the most convincing evidence for a separate surgical profession was demonstrated by Lefebvre's[11] translation of the texts from the Old Kingdom, which talked of the priests (**w'b.w**) of Sekhmet, a warrior goddess who inflicted death and disease, as being **swnw** or in other words, medically qualified. *Hery-shaf-nakht* (No. 64), who was chief of the king's physicians, and talking of himself, said,

> I was overseer of the priests of Sekhmet, overseer of magicians, Chief Physician of the King who daily reads the book, who (?treats . . .) when he is ill (?) who lays his hand on the diseased and thereby knows his condition, gifted in examining with the hand, the Sekhmet priest Hery-shef-nakht, son of Sat-Sekhmet.

Unfortunately, this does not support the widely held assumption that these priests were the surgeons of ancient Egypt, but simply that they were medically adept.

Further evidence that seems to demonstrate that the priests of Sekhmet were surgeons comes from sections of the Edwin Smith and Ebers papyri. Here **swnw,sȝ.w** (magicians) and the priests of Sekhmet feel the pulse and diagnose disease indicating the apparently separate nature of these professionals. What is interesting to note is that Sekhmet are mentioned before the **swnw** in the Edwin Smith papyrus, which is ostensibly surgical in content, and occurs after **swnw** in the medical Ebers papyrus. This seems to indicate to Ebbell[12] that Sekhmet were indeed a separate medical body, probably surgeons.

Modern surgery is defined as a 'branch of medicine concerned with treatment of injuries or disorders of the body by incision, manipulation or alteration of organs, etc., with the hands or with instruments' (from the *Oxford Dictionary*). As such, if these modern criteria are to be applied to the ancient Egyptians, then any prospective surgeons must have some knowledge of internal anatomy. The question remains as to how they came by this learning. Certainly, the medical papyri indicate a literary source of knowledge, but what is far more easily demonstrable is the knowledge that the embalmers of ancient Egypt must have possessed. There is scarce evidence for physician-embalmers with only a single reference in Genesis 50:2, and a further identification by Spiegelberg[13] of physicians within the embalming profession (Figure 2). It is certainly an attractive proposition to link surgical practice with the only real group of individuals that would have possessed the necessary practical skill and knowledge to perform an operation. Certainly Sethe[14] was of the opinion that bandager-embalmers **wyty** (Wb. I. 379.9ff) were doctors who specialized in surgery, based on descriptions in an early version of the *Book of the Dead*. The **wpy** 'opener' described in an earlier section of the book may

Table 1 **Ancient Egyptian medical papyri and their contents**

Papyrus	*Date (BC)*	*Content*
Ebers	1555	Medicine, gynaecology, surgery and ophthalmology
Edwin Smith	1600	Surgical trauma
Kahum	1900	Women and pregnancy
Berlin	1350–1200	Childbirth, and physicians formulary
Chester Beatty VI	1200	Anal disease
Hearst	1550	Physicians formulary
London	1350	*Ibid*
Brooklyn	Unknown	Snakebite,? toxicology
Carlesberg VIII	Unknown	Eye diseases, conception and pregnancy
Ramesseum IV, V	Unknown	Medico-legal

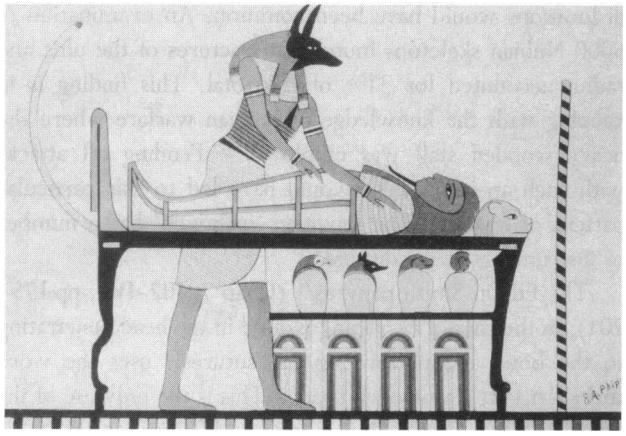

Figure 2 **Embalmer in the guise of Anubis, God of Mummification and the Dead**

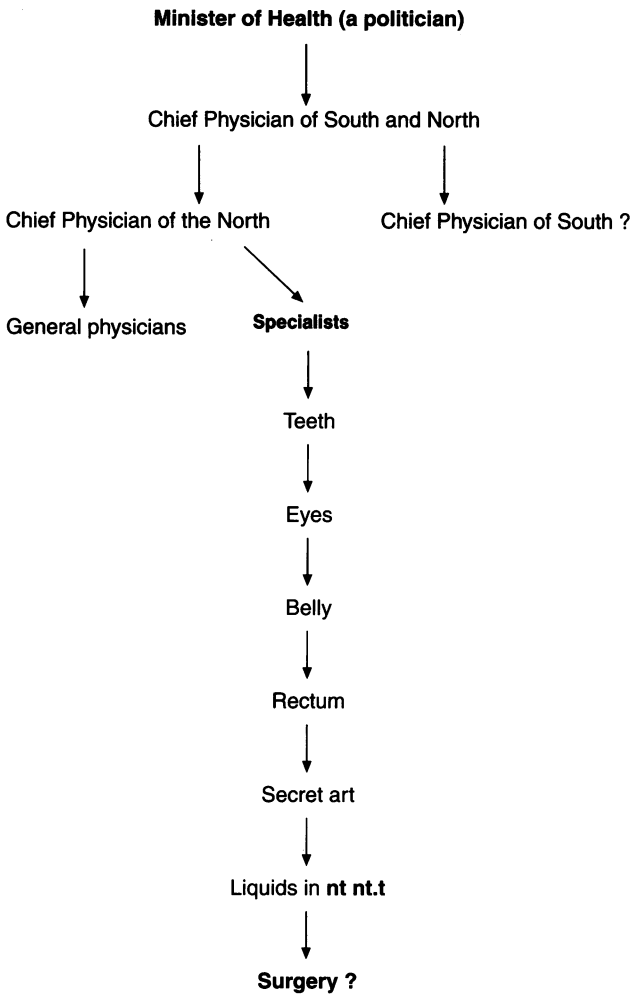

Figure 3 **Organization of the Medical Corps (after Ghalioungui P)**

have been an 'opener of the body', or surgeon, akin to the parascheist of Diodorus's description (I, p 91). It is here, however, that we encounter a problem with the **wpy** as a possible surgeon of antiquity. Diodorus writes of the abuse, both physical and verbal, that the parascheists received on making incisions in the side of mummies for the removal of organs[15] and this would, if accurate, indicate some sort of religious taboo upon the making of incisions, and would certainly favour the rejection of the **wpy** as a surgeon. Rawling also estimated that of the 30 000 mummies that had been examined there was not a single report of a surgical scar[16]. It is certain that, whether or not surgeons and embalmers existed as separate entities from the Old to the New Kingdom, by the Greek Period these professions were united[17], even though by all accounts their grasp of surgical practice seemed inferior to that of the Old Kingdom[18].

In conclusion, and perhaps in final support for surgeons as a separate group in ancient Egypt, Herodotus' vist to Egypt during the Persian occupation of the fifth century BC identified the development of specializations which may have included surgeons:

> Medicine is practised among them on a plan of separation; each physician treats a single disorder, and no more; thus the country swarms with medical practitioners, some undertaking to cure diseases of the eye, others of the head, others again of the teeth, others of the intestines, and some of those which are not local[19].

It may be that surgery was indeed a separate practice before this time, but because of social or religious taboos had to be practised in relative secrecy. Indeed Lefebvre[20] describes a certain Khouy as an interpreter of the secret art that uses the hieroglyphic determinative for 'flesh'. One wonders whether Khouy was that most elusive of creatures, the ancient Egyptian surgeon.

INSTRUMENTS AND WORK OF THE ANCIENT EGYPTIAN SURGEON

Many examples of proposed surgical instruments have been discovered. Some were undoubtedly used in the mummification process; however, it has been difficult to prove that they were actually used in surgical practice. The famous relief of surgical instruments at the temple of Kom Ombo is often presented as the instruments of the ancient Egyptians; however, it is almost certainly Roman in origin (Figure 4). The medical papyri contain many references to instruments. By establishing correct translations and identifying, from the available texts, the use to which these instruments were put it should be possible to reassess archaeological finds to establish authentic instruments.

Sutures

The first description in written history of suturing is to be found in the Edwin Smith papyrus[21] (pp 225–33) Ch10 V6. . . . 'thou shouldest palpate his wound, (and) draw together for him his gash with stitching', using the

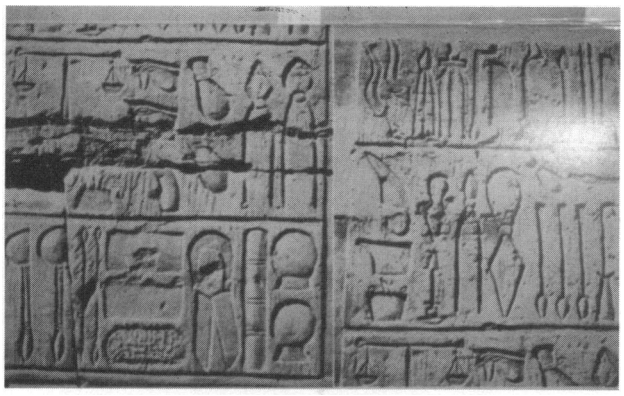

Figure 4 **Medical instruments on the wall of the temple of Kom Ombo**

Egyptian word **nḏry** to mean 'draw together'. The surgical use of this word has been found in only three other instances:

(i) Obscure passage in Kahun Medical papyrus[22] (pp 3,19) denoting the 'bringing together (**nḏry**) of the vagina'
(ii) The preparation of a lancet in Ebers papyrus[23] (pp 6,7,109)
(iii) The lancing, or treatment of, a swelling of some sort in Ebers papyrus (pp 10,109), with the subsequent stitching of the wound

The question then arises as to what was used to 'draw together' such wounds. Again in Edwin Smith[21] (Chap 10) we find that the surgeon is charged with 'drawing together' the wound, 'with **ỉdr**', or '**ỉdr** it' (Wb.I.154.17–18). From this we can deduce that the Egyptian **idr** must translate in this instance as 'stitch'.

Further in Chap 10(f), 'If thou findest the **ỉdr** of this wound loose thou shouldest draw it together for him with two strips (of plaster), **'yr.wy**'.

Surgeons obviously had access to needles, stitches, and what could only be the ancient Egyptian equivalent of butterfly strips.

There is also a fascinating case of the use of such stitches by embalmers. In the early 1900s the mummy of Nes-Tet-Nab-Taris (XXI), an elderly emaciated lady, was autopsied. A number of pressure sores were found. Of particular interest was the use of a fine stitch to sew a sinus extending transversely from the left pudendal labium outward into the gluteal area[24]. It is quite possible that this procedure was performed during her life, rather than as part of the mummification procedure.

Splints and Orthopaedics

Surgeons skilled in orthopaedics would have been in great demand in ancient Egypt. Wars and accidents, in the ostensibly agrarian society, meant that fractures and dislocations would have been common. An examination of 6000 Nubian skeletons found that fractures of the ulna and radius accounted for 31% of the total. This finding is in keeping with the knowledge of Nubian warfare where the heavy wooden staff was employed[25]. Fending off attacks with such an instrument would have led to this particular pattern of fracture. The Egyptian 'orthopod' had a number of instruments at his disposal.

The Edwin Smith papyrus[21] (Chap 7, III2–IV4, pp 175–201), in the case of 'A gaping wound in the head penetrating to the bone and perforating the sutures', uses the word **mḏȝ.t n.t ḫt**, 'a wooden brace'. This is the only use of the word in Edwin Smith, but it may be identical to the word **mḏȝ.t**, chisel or graver.

Further, in Ebers there is a discussion of a tube used for such a purpose that may have been hollow reed. There is, however, no evidence that it was padded with linen, as has been suggested. It may well have been a piece of cork to hold open the mouth, possibly in tetanic spasms, rather than a true splint.

There is a further description of a splint in the Edwin Smith papyrus[21] (Chap II, V10–15, pp 234–44), where, on the treatment of a broken nose (V11–14), one is instructed to splint the nose with **bḏȝ.w** (Wb.I.488.13). This is a rare word that occurs in traditional religious texts, in which it is only found twice, as the 'spar' of a ship. **bḏȝ** is often shown with the erect phallus of Osiris, doubtless indicating its shape. It has been initially concluded from this that it was a post-like roll of linen for splinting the broken nose. However, this word, found only in Edwin Smith, is probably related to the Egyptian for boat, **bȝw**. It bears no resemblance to the Egyptian word for linen, or bandage **wtȝ** (variant of **wt**)[26,27]. **bḏ** is further used in Chap 11, 12, 23, 34 of Edwin Smith, where its hieratic determinative is a narrow and elongated rectangle; denoting a view across its axis, and again, its probable shape. Bearing in mind the relation of this word to the archaic Egyptian for boat, there is a far stronger case that this was a device analogous to a 'nasal splint', probably of wood rather than linen.

Splints would have come in many shapes, with or without linen padding. Undoubtedly there would have been many more splints in use than have been described in the limited scholion of medical papyri[28].

One of the finest examples of the treatment of a dislocation is to be found in case 25 of the Edwin Smith papyrus, where the technique described for the relocation of a jaw [*sic*] is unchanged between Pharaonic times and today (Figure 5).

Scalpels and Incisions

There are many references in the papyrus Ebers to the undertaking of the 'knife-treatment' (**dwʿ**), particularly for

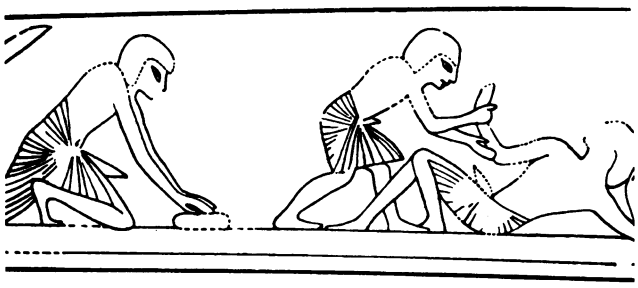

Figure 5 **Details from works of the architect Ipy—another possible relocation this time of a shoulder joint**

the opening of abscesses (**ꜥ3t nt ryt** and **ꜥ3t nt whdw**) and the removal of a tumour of fat (**ꜥ3t nt ꜥd**). For those with a wish to pursue this fascinating section on the work of a possible surgeon, one should consult Ebers[29] (pp 863–77).

In Ebbell's translation of the Ebers papyrus[29], 'then thou shalt go round it with a **ḫpt**-knife to the limits of all. . .', we have our first description of what may have been a scalpel. George Ebers further discussed the case of this instrument[23], referring to a different word, **χpr**.

It appears that the function of **ḫpt**, or **χpr**, was to debride a wound, and the most logical instrument would have been a curved scalpel. From Gardiner's 'List'[1](3rd edn), this word is close to the ancient Egyptian meaning 'sculptured relief', which may well indicate that this particular knife was used by a medical 'sculptor' i.e. surgeon, and was therefore a scalpel.

A further knife of medical origin is described in Ebers[30]. Ebbell[29] translated it as **ds**-knife. The use of this particular knife is advised to split certain swellings and then the use of the **hnwḫ**-instrument (?forceps)[29] (Wb.III.494.9) to remove the contents of the swelling. The Ebers papyrus goes on further to talk of 'removing?' the swelling with a **š3s**-knife. This is a confusing situation, but it is possible to isolate from these texts three separate instruments, **ds**, **hnwḫ**, and **š3s** which can be used in the treatment of **ꜥ3w.t**, the cause of the swelling. This later word has been translated as a type of dermal larva, which, if correct, would seem to indicate that **ds** and **š3s** were specific forms of scalpel to cut out the larvae, and the **hnwḫ** a type of forcep, to lift them out of the skin.

The fact that there has not been a single report of an iatrogenic incision comes as no surprise. The mummification process, and its liberal use of libation fluids, caused much of the integument to be damaged and darkened[31]. There have also been many false reports of incisions. In the head of Tut-Ankh-Amun, the scar behind the left mastoid was initially thought to be due to an operation[32]. However, close examination of the skull X-rays revealed underlying sclerotic changes, secondary to suppurating otitis media, which had broken through the skin[33,34] (Figure 6).

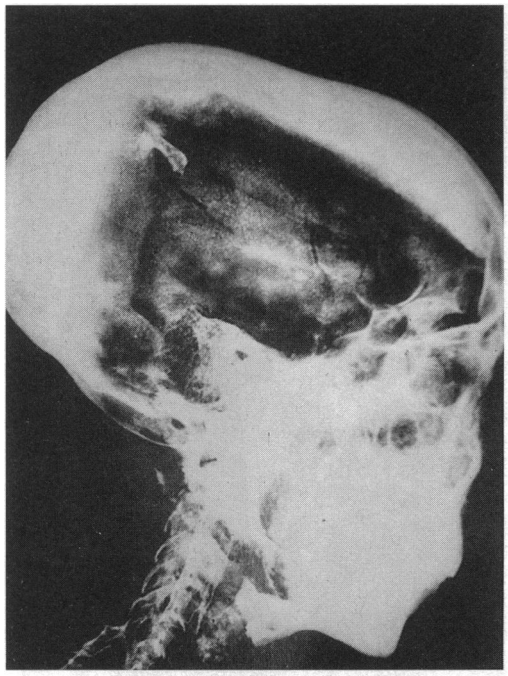

Figure 6 **X-ray of the skull of the boy pharaoh Tut-Ankh-Amun**

Lancets and Trephination

The Ebers papyrus[23] (pp 109, 876) discusses the use of the **swt** to treat 'oozing in any limb', probably a description of a haematoma. It would seem that the **swr**-reed was akin to the modern surgical lancet for the relief of subcutaneous pressure points. There is some difficulty with assuming that this instrument was a natural reed. By describing it as **swt** there is an obvious suggestion of the specialized nature of this instrument. Perhaps it was composed of metal or ivory, and the reference to the reed simply implied its shape. Alternatively, the word may be the ancient Egyptian equivalent of the lancet.

If an instrument existed for trephination then it may have been based on a lancet/borer. The evidence for trepanning goes back at least to the Neolithic period, and its geographic distribution was extensive, being found in Europe and South America[35,36]. However this was not the case for Dynastic Egypt. Even during the Greek Period when contact with mainland Greece may have exposed the Egyptian surgeon to this practice, there was virtually no evidence of trephination[37]. Although Marc Ruffer[38] and El-Batrawy[39] both presented cases of possible trephinations, this is nothing in comparison with the thousand plus cases found in South America. Cases of parietal thinning, congenital deformity and neoplasia have often been mistakenly identified as trephination[40]. The lack of this procedure in ancient Egypt may indeed reflect the high medical skill of the surgeons. In a profession reasonably free of magico-ritualistic practices, the surgeon would have recognized the exceptionally high morbidity and mortality associated with trephination (Figure 7).

Figure 7 **Medieval depiction of trephination. (*Courtesy of the Trustees of the Wellcome Trust*)**

Cauterization

Cauterization is first described in Ebers[23][pp 108, 872 CVIII (instructions concerning a swelling of vessels, probably an aneurysm)], 'Thou shalt perform an operation for it, heat with fire, it shall bleed much. Thou shalt treat it as **sȝ-ḥmm** treats'.

Further in Edwin Smith[21] (Chap 39 XIII3–12), describing 'tumours or ulcers in the breast, perhaps resulting from injury', we are told in d.XIII5–6, 'One having tumours with prominent head in his breast, (and) they predispose to cysts of pus. An ailment which I will treat with the fire-drill, **ḏȝ**'. This fire-drill, or **ḏȝ**, may be related to the instrument in Ebers 108, 872. It is not usual to connect verdict directly with device, but there are other examples of this grammatical anomaly in Edwin Smith 46, XV13 and Ebers 860/866/869/870.

Finally, in the treatment section of Edwin Smith[21] (Chap 39, XII6–9), there is the use of the word **šʿm** as part of the description of cauterization. The only other occurrence of this word is in Ebers[23] [109, 15 (No. 876)].

From these sections it is possible to identify three ancient Egyptian words that relate to cauterization: (i) Ebers[23] (108, 8): '. . . treat it as **sȝ-ḥmm** treats'; (ii) Smith[21] (39, 6): 'an ailment which I will treat with a fire-drill (**ḏȝ**)'; (iii) Smith[21] (39, 6): '**šʿm**'. There may have been two different types of cauteries, fire-drill viz. hot lance. It is quite possible that the **ḏȝ** [21](39, 6) was the tool of the **sȝ-ḥmm**[23] (108, 8). The fact that they appear in two separate medical works does not preclude this interpretation. However, it seems far more likely that we are dealing with two separate instruments for cauterization, and the word **šʿm** of Edwin Smith[23] (39, 6) is, in fact, the verb of **ḏȝ**.

CONCLUSION

The question of ancient Egyptian surgery is an important one. That a well organized, hierarchical and knowledgeable medical system existed in Dynastic Egypt is without doubt. Specialization within the medical profession certainly existed[41]. The necessary surgical accoutrements were also available for successful surgery. Analgesia and sedatives, including maybe that from the mandrake fruit, were available. However, it is questionable whether opium was known in ancient Egypt before the eighteenth Dynasty[42]. Although no antibiotics were known, liberal use of honey and copper based ointments, both bactericidal, were used in the treatment of wounds[43].

As further archaeological evidence is brought to light, the ancient Egyptian surgeon will no doubt take a rightful place in the medical hierarchy—the first from an ancient civilization.

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